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REMARKS

Claims 1, 6, 7, 9-13, 15, 17, 18, 20-23, 25-27, 44, 52, 58, and 61-77 are pending. Claims 1, 7 9 10, 12, 15, 22, 25, 44, 61-64, 66-68, 75, and 76 have been amended.

Allowed claims 68, 75, and 76 have been amended for consistency and to correct antecedent basis.

The Examiner's courtesy in conducting a telephone interview is acknowledged with appreciation. During the interview, objections and rejections under 35 U.S.C. § 112 related to the "overall volume" of the processing apparatus were discussed. Substitution of the phrase "liquid holding capacity" was discussed, and agreement was reached regarding amendments to the claims and the specification to overcome the §112 rejections, as noted below. The Examiner indicated that claims amended accordingly were likely to receive favorable consideration with respect to the rejections over the prior art. Claims 1, 12, 15, 21, and 22 have been so amended.

1. Claim objections and rejections under 35 U.S.C. § 112:

The Examiner objects to claim 1, and the claim stands rejected under 35 U.S.C. § 112, first and second paragraphs, on the basis that the limitation "reducing an overall volume capacity of said processing apparatus" is not supported in the specification and lacks clarity. Claim 1 has been amended as agreed in the Examiner interview. As discussed during the Examiner interview, support for the amended claim is found, for example, in Figs. 1-4. Referring in particular to Figs. 2 and 4, when upper wall component 22 is released, the liquid holding capacity of the processing apparatus 10 is reduced (i.e., the apparatus 10 is incapable of holding a larger volume of liquid with the upper wall component released.) The specification has been amended as agreed during the interview to describe what is evident from the drawings. Claim 1 is submitted as supported by the specification, and clearly and distinctly

reciting the invention. Applicant respectfully requests withdrawal of the objection and these rejections of claim 1.

Claim 6 stands rejected under 35 U.S.C. § 112, second paragraph, as being dependent on rejected claim 1. Claim 1 has been discussed above. Claim 6 is submitted as particularly pointing out and distinctly claiming the subject matter of the invention.

The Examiner objects to claim 7, and the claim stands rejected under 35 U.S.C. § 112, first paragraph, on the basis that the limitation "continuously feeding an etching fluid; stopping the continuous feeding of etching fluid" is not supported in the specification. Applicant respectfully disagrees, and refers to the present specification at page 9, lines 4-12, which discloses that etching solution can be removed from a continuous flow etching apparatus when the etching solution flow has been stopped. Claim 7 is submitted as supported by the specification, along with its dependent claims 9 and 13. Applicant respectfully requests withdrawal of this objection and rejection of claim 7.

The Examiner objects to claim 15, and the claim stands rejected under 35 U.S.C. § 112, first and second paragraphs, on the basis that the limitation "to rapidly reduce an overall volume capacity of said processing apparatus" is not supported by the specification and lacks clarity. Claim 15 has been amended as agreed during the Examiner interview. Support for the amended claim is provided, for example, by Figs. 5-8. Figs. 6 and 8 in particular illustrate that when upper wall component 122 is released telescopically, the liquid holding capacity of the processing apparatus 110 is reduced (i.e., the apparatus 110 is unable to hold as much liquid). The specification has been amended to describe what is evident from the drawings. Claim 15 is submitted as supported by the specification, and clearly and distinctly reciting the subject matter of

the invention. Applicant respectfully requests withdrawal of this objection and these rejections.

The Examiner objects to claim 21, and the claim stands rejected under 35 U.S.C. § 112, first and second paragraphs, on the basis that the limitation "reducing a volume capacity of said wet etching vessel" is not supported by the specification and lacks clarity. Claim 21 has been amended as agreed during the Examiner interview. Applicant respectfully submits that support for the limitation is provided, for example, by Figs. 1-10, which illustrate various methods by which the liquid holding capacities of the processing apparatus 10, 110, and 210 are reduced. The specification has been amended to describe what is evident from the drawings. Claim 21 is submitted as supported by the specification and clearly and distinctly reciting the subject matter of the invention. Applicant respectfully requests withdrawal of this objection and these rejections.

The Examiner objects to claim 44, and the claim stands rejected under 35 U.S.C. § 112, first paragraph, on the basis that the limitation "continuously feeding said aqueous hydrofluoric acid solution to process said semiconductor waver; stopping said continuous feeding acid solution" is not supported in the specification. Applicant respectfully disagrees, and refers to specification page 9, lines 4-12, which discloses that etching solution can be removed from a continuous flow etching apparatus when the etching solution flow has been stopped. Applicant respectfully requests withdrawal of this objection and rejection.

2. Rejections under 35 U.S.C. § 102:

Rejections based on Nishizawa et al.:

Claims 1, 6, 7, 9, 44, and 61 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 5,275,184 to Nishizawa et al. This rejection respectfully is traversed.

Claim 1 recites a method for removing surface contaminants from an air/liquid interface of a semiconductor processing bath for processing semiconductor wafers. The method includes "immersing wafers in a bath of semiconductor processing fluid in a processing apparatus," "processing said wafers immersed in said bath of semiconductor processing fluid contained within said processing apparatus," and "reducing a liquid holding capacity of said processing apparatus, thereby rapidly displacing an upper portion of said bath of semiconductor processing fluid from said processing apparatus while said wafers remain fully immersed in a lower portion of said bath of semiconductor processing fluid within said processing apparatus to remove said surface contaminants from said air/liquid interface."

The reference to Nishizawa et al. discloses a wafer treatment process performed in a fixed-volume wafer bath 1. Treatment solutions flow through supply line 3 into a base of wafer bath 1. Various treatments are applied by changing the solution flowing into the wafer bath 1 through supply line 3. Wafers are lifted out of the wafer bath 1 at treatment completion "without emptying wafer treatment bath 1." The reference to Nishizawa et al. does not teach a method of wafer treatment that includes "reducing a liquid holding capacity of said processing apparatus, thereby rapidly displacing an upper portion of said bath of semiconductor processing fluid from said processing apparatus while said wafers remain fully immersed in a lower portion of said bath of semiconductor processing fluid within said processing

apparatus to remove said surface contaminants from said air/liquid interface." On the contrary, wafer bath 1 of Nishizawa et al. has a constant liquid holding capacity, and no means for "reducing a liquid holding capacity of said processing apparatus, *thereby rapidly displacing* an upper portion of said bath." Nishizawa et al. does not anticipate claim 1 and its dependent claim 6.

Claim 7 recites a method for reducing the contamination on a semiconductor wafer from a wet etching bath. The method includes "immersing said semiconductor wafer in said wet etching bath contained in a processing apparatus," and "processing said semiconductor wafer in said wet etching bath by continuously feeding an etching fluid." The method continues by "stopping the continuous feeding of etching fluid," "subsequently rapidly reducing a volume of said wet etching bath contained within said processing apparatus by removing an upper portion of said etching fluid from said processing apparatus to reduce an overall volume of etching fluid in said processing apparatus and remove surface contaminants from an air/liquid interface of said wet etching bath while retaining said semiconductor wafer fully immersed in a lower portion of said etching fluid contained within said processing apparatus," and "subsequently removing said semiconductor wafer from said wet etching bath."

The reference to Nishizawa et al. discloses a treatment process in which etching solution in wafer bath 1 is displaced by a uniform flow of treatment solution fed continuously through line 3 into the bottom of the wafer bath 1. As a result, surface contamination is not a concern, and wafers are removed "without emptying wafer treatment bath 1." See col. 9, lines 2-5. The Nishizawa et al. reference does not teach a method of wafer treatment having a continuous feed by "stopping the continuous feeding of etching fluid" and "subsequently rapidly reducing a volume of said wet etching bath contained within a processing apparatus by removing an upper portion of said etching fluid from said processing apparatus to reduce an overall volume of

etching fluid in said processing apparatus and remove surface contaminants from an air/liquid interface of said wet etching bath." On the contrary, the only method disclosed by the Nishizawa et al. reference for "removing" etching solution is to displace the etching solution with another solution through supply line 3. Displacement occurs uniformly according to the Nishizawa et al. reference, and does not and can not occur by "stopping the continuous feeding of etching fluid." Nishizawa et al. does not anticipate claim 7. Claim 7 and its dependent claims 9-11 are submitted as patentable over the cited reference to Nishizawa et al.

Claim 44 recites a method for reducing the contaminants on a silicon wafer during a wet etching process. The method includes "immersing a wafer boat suspended on a lifting arm in an etching vessel having an aqueous hydrofluoric acid solution therein for a sufficient time to etch said silicon wafer" and "continuously feeding said aqueous hydrofluoric acid solution to process said semiconductor wafer." The method also includes "stopping said continuous feeding of acid solution," and "rapidly removing said wafer boat from said etching vessel to remove surface contaminants residing on an upper surface of said aqueous hydrofluoric acid solution by an upward movement of said arm, thereby causing an upper portion of said aqueous hydrofluoric acid solution to spill out of said vessel to reduce the amount of said aqueous hydrofluoric acid solution in said etching vessel."

The reference to Nishizawa et al. discloses a wafer treatment method featuring continuous flow of treatment solutions. As a result, the Nishizawa et al. reference discloses that there "is little fear of formation of an oxide film on a wafer surface or contamination with impurities in the air." Moreover, wafers are removed "without emptying wafer treatment bath 1" according to the Nishizawa et al. reference at col. 9, lines 2-5. Nishizawa et al. does not disclose "stopping said continuous feeding of acid solution," and "rapidly removing said wafer boat from said etching vessel to

remove surface contaminants residing on the upper surface of said aqueous hydrofluoric acid solution by an upward movement of said arm, thereby causing an upper portion of said aqueous hydrofluoric acid solution to spill out of said vessel to reduce the amount of said aqueous hydrofluoric acid solution in said etching vessel." On the contrary, the Nishizawa et al. reference discloses that etching solution is displaced by the uniform rising flow of another solution through supply line 3 into a constant volume of solution. Displacement will not occur at all if the invention of Nishizawa is operated by "stopping the continuous feeding of etching fluid." Nishizawa et al. does not anticipate claim 44. Claim 44 is submitted as patentable over the cited reference to Nishizawa et al.

Claim 61 recites a method for removing surface contaminants from an air/liquid interface of a semiconductor processing bath for processing semiconductor wafers. The method includes "immersing said semiconductor wafers in said semiconductor processing bath contained in a processing apparatus," and "reducing a volume of said semiconductor processing bath contained within said processing apparatus by rapidly removing an upper portion of said semiconductor processing bath present in said processing apparatus, while said semiconductor wafers are immersed in a remaining lower portion of said semiconductor processing bath, to permit flow of said upper portion of said processing bath out of said processing apparatus and reduce a total volume of liquid contained within said processing apparatus and thereby break eddy currents holding said surface contaminants at said air/liquid interface."

The reference to Nishizawa et al. discloses a wafer treatment process performed in wafer bath 1, which has a fixed volume. Treatment solutions flow through supply line 3 into the base of wafer bath 1. Treatment is conducted continuously by changing the solution flowing upwardly into the wafer bath 1. Wafers

are lifted out of the wafer bath 1 at treatment completion "without emptying wafer treatment bath 1." See col. 9, lines 4-6. The Nishizawa et al. reference does not teach a wafer treatment method that includes "reducing a volume of said semiconductor processing bath contained within said processing apparatus by rapidly *removing* an upper portion of said semiconductor processing bath present in said processing apparatus, while said semiconductor wafers are immersed in a remaining lower portion of said semiconductor processing bath, to permit flow of said upper portion of said processing bath out of said processing apparatus and *reduce a total volume* of liquid *contained within* said processing apparatus." Furthermore, Nishizawa et al. does not teach such a method that will "thereby break eddy currents holding said surface contaminants at said air/liquid interface." The Examiner refers generally to Fig. 2 for support of the rejection, but Fig. 2 shows a processing bath contained within wafer bath 1 having a constant volume of fluid. The reference to Nishizawa et al. does not disclose a wafer process including steps to "reduce a total volume of liquid *contained within*" wafer bath 1, and so does not anticipate claim 61 and its dependent claims 62-64 and 67.

Rejections based on Kamikawa et al.:

Claims 66 and 73 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,131,588 to Kamikawa et al. This rejection is traversed.

Claim 66 recites a method for removing surface contaminants from an air/liquid interface of a semiconductor processing bath for processing semiconductor wafers. The method includes "immersing said semiconductor wafers in a semiconductor etching bath," and "rapidly removing an upper portion of a semiconductor processing fluid present in said etching bath by rapidly removing a wafer boat containing said wafers from said etching bath, to permit flow of said upper

portion of said processing fluid and thereby break eddy currents holding said surface contaminants at said air/liquid interface."

Kamikawa et al. discloses a wafer processing apparatus in which a wafer boat is lifted out of an ozone water bath using a wafer guide mechanism 83 including a threaded screw lift driven by a motor. Kamikawa et al. contains no teaching of "rapidly removing an upper portion of a semiconductor processing fluid present in said etching bath by rapidly removing a wafer boat containing said wafers from said etching bath, to permit flow of said upper portion of said processing fluid and thereby break eddy currents holding said surface contaminants at said air/liquid interface." On the contrary, step 1413 of the process disclosed in the Kamikawa et al. reference, illustrated in Fig. 24, shows wafer W removed to the drying chamber 42 above bath 41. The bath 41, with the wafer W removed, is shown to contain a maximum volume of wafer processing solution, and the overflow trough on the sides of the bath 41 contain no liquid. Nothing in the Kamikawa et al. reference teaches that any wafer processing solution has been removed by lifting the wafer W. Kamikawa et al. does not anticipate a wafer treatment method that includes "rapidly removing an upper portion of a semiconductor processing fluid present in said etching bath by rapidly removing a wafer boat containing said wafers from said bath."

Claim 73 recites a method for removing surface contaminants from an air/liquid interface of a semiconductor processing bath for processing semiconductor wafers." The method includes "processing said semiconductor wafers in a semiconductor etching solution," and "rapidly removing an upper portion of said semiconductor etching solution by rapidly removing a wafer boat containing said wafers from said bath, to permit flow of said upper portion of said processing fluid and thereby break surface tension forces holding said surface contaminants at said air/liquid interface."

Kamikawa et al. discloses a wafer processing apparatus in which a wafer boat is lifted out of an ozone water bath using a wafer guide mechanism 83 including a motor operating a threaded screw. Kamikawa et al. contains no teaching of "rapidly removing an upper portion of said semiconductor etching solution by rapidly removing a wafer boat containing said wafers from said bath, to permit flow of said upper portion of said processing fluid and thereby break surface tension forces holding said surface contaminants at said air/liquid interface." On the contrary, in step 1413 of the process disclosed in the Kamikawa et al. reference, illustrated in Fig. 24, wafer W is removed to the drying chamber 42 above bath 41. No solution is shown or described to have been removed from bath 41. The reference to Kamikawa et al. does not anticipate a wafer treatment method that includes "rapidly removing an upper portion of said semiconductor etching solution by rapidly removing a wafer boat containing said wafers from said bath."

3. Rejections under 35 U.S.C. § 103:

Rejections based on Nishizawa et al. in view of Itoh et al.:

Claims 10, 27, and 62 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishizawa et al. in view of U.S. Pat. No. 5,795,401 to Itoh et al.

Claim 10 depends from claim 7, which is submitted as patentable over the reference to Nishizawa et al. The Itoh et al. reference does not cure the deficiencies of Nishizawa et al. Itoh et al. has been cited as teaching the use of a paddle to remove fluid from the top portion of a processing bath. The Examiner refers to col. 10, lines 18-28 of the Itoh et al. reference, which discusses a "back pressure paddle 7." Contrary to the Examiner's assertion, however, back pressure paddle 7 does not *remove* fluid from

the top portion of a processing *bath* in which a substrate is *immersed,* but instead *applies* fluid to the back of a substrate supported in a substrate chuck. Indeed, back pressure paddle 7 is not a "paddle" in the generally accepted sense, but rather is a fluid jet. See Fig. 14 and associated text. Fluid is jetted at the back of the substrate 1 to generate back pressure against the scrubbing brush applied to the front of the substrate. In addition, the substrate is not "immersed" in a treatment bath when the fluid jet from the back pressure 'paddle' is applied, so the reference to Itoh et al. does not teach removing fluid from the top portion of such a processing bath.

The Examiner asserts that Itoh et al. discloses "the use of a back paddle to jet (remove) out the wash fluid during process of cleaning of semiconductor substrate." Applicant has studied the disclosure of Itoh et al. and finds no such disclosure. On the contrary, the Itoh et al. reference teaches that wash fluid is applied by jet nozzle 46 to brushes on the front side of the substrate 1. Back paddle 7 generates back pressure on substrate 1 by jetting back pressure fluid on the back side of substrate 1. Referring to Fig. 14, substrate 1 is supported on substrate chuck 6 such that wash fluid is applied to the front of substrate 1 (facing toward the bottom of Fig. 14), while back pressure fluid is applied to the back of substrate 1 (facing toward the top of Fig.14). The reference to Itoh et al. contains no disclosure to using the "back paddle to jet (remove) out the wash fluid during process of cleaning of semiconductor substrate."

Applicant respectfully submits that the Examiner's strained reading of the Itoh et al. reference suggests that the reference is being applied in hindsight using Applicant's disclosure as a blueprint. Itoh et al. contains no evidence whatsoever regarding obviousness of "immersing said semiconductor wafer in said wet etching bath contained in a processing apparatus," "processing said semiconductor wafer in said wet etching bath by continuously feeding an etching fluid," "stopping the continuous feeding of said etching fluid," and "subsequently rapidly reducing a

volume of said wet etching bath contained within said processing apparatus by removing an upper portion of said etching fluid from said processing apparatus to reduce an overall volume of etching fluid in said processing apparatus and remove surface contaminants from an air/liquid interface of said wet etching bath while retaining said semiconductor wafer fully immersed in a lower portion of said etching fluid contained within said processing apparatus," and "subsequently removing said semiconductor wafer from said wet etching bath," wherein the "upper portion of said etching fluid is removed by a paddle from the top of said wet etching bath." Claim 10 is submitted as patentable over the cited references to Nishizawa et al. and Itoh et al.

Moreover, the prior art lacks the motivation necessary to combine the references to Nishizawa et al. and Itoh et al. The Examiner's assertion that the combination would have been obvious "because the use of a paddle would have provided removing of contaminants from the top of the wafer etching bath" has no factual support in the cited prior art. Any motivation for combining the references appears to come entirely from Applicant's disclosure, in an improper attempt at hindsight reconstruction of Applicant's invention. Absent the requisite motivation, the proposed combination of Nishizawa et al. and Itoh et al. fails to render *prima facie* obvious the subject matter of claim 10.

The rejection of claim 27 is not understood. Claim 27 depends from claim 17, which has been found by the Examiner to be allowable. Claim 27 is submitted as patentable over the proposed combination of Nishizawa et al. and Itoh et al.

Claim 62 depends from claim 61, which is submitted as patentable over Nishizawa et al. Itoh et al. does not cure the deficiencies of Nishizawa et al. As noted above with respect to claim 10, Itoh et al. teaches the application of a back pressure fluid using back pressure "paddle" 7. Itoh et al. does not teach or suggest removing

surface contaminants from an air/liquid interface of a semiconductor processing bath for processing semiconductor wafers by "immersing said semiconductor wafers in said semiconductor processing bath contained in a processing apparatus," and "reducing a volume of said semiconductor processing bath contained within said processing apparatus by rapidly removing an upper portion of said semiconductor processing bath present in said processing apparatus, while said semiconductor wafers are immersed in a remaining lower portion of said semiconductor processing bath, to permit flow of said upper portion of said processing bath out of said processing apparatus and reduce a total volume of liquid contained within said processing apparatus and thereby break eddy currents holding said surface contaminants at said air/liquid interface," wherein "said upper portion of said semiconductor processing bath is removed by a paddle from a top of said bath." In addition, the proposed combination lacks the requisite motivation, the Examiner's conclusion of obviousness having no factual support in the cited references. Claim 62 is submitted as patentable over the proposed combination of Nishizawa et al. and Itoh et al.

Rejection based on Nishizawa et al. in view of Mohindra et al.:

Claim 63 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishizawa et al. in view of U.S. Pat. No. 5,958,146 to Mohindra et al. This rejection is traversed.

Claim 63 depends from claim 61, which is submitted as patentable over the reference to Nishizawa et al. Mohindra et al. does not cure the deficiencies of Nishizawa et al. Mohindra et al. has been cited as providing a valve. The Examiner refers to col. 3, lines 56-60 of the Mohindra et al. reference, which discusses "a first control valve operably coupled to the vessel, and adapted to provide a substantially particle free environment adjacent to the front face and the back face as the liquid is

being removed." The first control valve evidently is the valve to which the Examiner refers when he asserts that "Mohindra et al. disclose the use of valve to remove during cleaning (etching) process of the semiconductor wafer." In fact, read in the context of the Mohindra et al. disclosure, the first control valve is an *inlet* valve that supplies a filtered gas. The first control valve is not used in a wafer treatment process in which an "upper portion of said semiconductor processing fluid is *removed* by opening a valve in said bath." On the contrary, the first control valve disclosed by the reference to Mohindra et al. provides a substantially particle free environment by *supplying* a gas such as filtered nitrogen that is virtually free from particles to form a particle free atmosphere as liquid is being removed. Mohindra et al. provides no evidence of obviousness for a process of removing surface contaminants from an air/liquid interface of a semiconductor processing bath for processing semiconductor wafers that includes "immersing said semiconductor wafers in said semiconductor processing bath contained in a processing apparatus," and "reducing a volume of said semiconductor processing bath contained within said processing apparatus by rapidly removing an upper portion of said semiconductor processing bath present in said processing apparatus, while said semiconductor wafers are immersed in a remaining lower portion of said semiconductor processing bath, to permit flow of said upper portion of said processing bath out of said processing apparatus and reduce a total volume of liquid contained within said processing apparatus and thereby break eddy currents holding said surface contaminants at said air/liquid interface," wherein the "upper portion of said semiconductor processing bath is removed by opening a valve in said processing apparatus." Claim 63 is patentable over Nishizawa et al. and Itoh et al.

Rejections based on Nishizawa et al. in view of Hayami et al.:

Claims 12, 15, 22, 25, 64, and 67 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishizawa et al. in view of U.S. Pat. No. 5,474,616 to Hayami et al. The rejections of these claims is traversed.

Claim 12 recites a method for removing surface contaminants from an air/liquid interface of a semiconductor processing cleaning bath for processing semiconductor wafers. The method includes "immersing said semiconductor wafers in said semiconductor processing cleaning bath contained in a processing apparatus," and "reducing a volume of fluid in said semiconductor processing cleaning bath before removing said semiconductor wafers by rapidly removing from a top of said processing apparatus an upper portion of a semiconductor processing fluid present in said bath while said wafers are in said bath, by hingedly releasing a door located at an upper portion of said processing apparatus to rapidly reduce a liquid holding capacity of said processing apparatus and to remove said surface contaminants from said air/liquid interface."

The reference to Nishizawa et al. discloses a method of wafer treatment by continuously and uniformly replacing solution in a constant-volume treatment bath. The Nishizawa et al. reference does not teach or suggest "reducing a volume of fluid in said semiconductor processing cleaning bath before removing said semiconductor wafers by rapidly removing from a top of said processing apparatus an upper portion of a semiconductor processing fluid present in said bath while said wafers are in said bath." Further, Nishizawa et al. does not teach or suggest removing "an upper portion of the semiconductor processing fluid," "by hingedly releasing a door located at an upper portion of said processing apparatus to rapidly reduce a liquid holding capacity of said processing apparatus and to remove said surface contaminants from said air/liquid interface." The Examiner recognizes the deficiencies in Nishizawa et al. and cites Hayami et al. to provide what is missing.

The reference to Hayami et al. does not cure the deficiencies of Nishizawa et al. Hayami et al. teaches a method for rinsing plate-shaped articles, such as semiconductor wafers, and cleaning equipment used in the rinsing method. Folding walls 20 are folded down to release treating fluid *prior to immersion* of the wafers being treated. Hayami et al. does not teach or suggest removing a volume of treatment water "while said wafers are in said bath" as recited in the claim 12. Hayami et al. does not teach or suggest a process that includes "immersing said semiconductor wafers in said semiconductor processing cleaning bath," and "reducing a volume of fluid in said semiconductor processing cleaning bath before removing said semiconductor wafers."

Further, the proposed combination of Nishizawa et al. and Hayami et al. fails to establish *prima facie* obviousness for lack of motivation, which must come from the prior art, not applicant's disclosure. Nishizawa et al. discloses a fixed-volume wafer bath in which a uniformly rising flow of treatment solutions prevents contamination of the air/liquid interface. The wafer can be "put into and taken out of surface treatment without emptying wafer treatment bath 1." See col. 9, lines 4-6 of Nishizawa et al. Thus, the reference to Nishizawa et al. provides no motivation for modifying the wafer treatment method to include "reducing a volume of fluid in said semiconductor processing cleaning bath," whether by using the folding doors of Hayami et al. or otherwise. The reference to Hayami et al. discloses releasing side doors *prior to* immersion of the wafers into the bath, thus achieving the goal of removing floating particles "as soon as possible." See col. 2, lines 46-51. Further, Hayami et al. teaches that at the end of the rinsing process, "there are almost no particles P floating on the surface of the cleaning water 100. [...] Thus, when the semiconductor wafers 10 are lifted up, there are almost no particles adhering to the surfaces of each of the semiconductor wafers 10." See col. 6, lines 52-59. The cited references to Nishizawa et al. and Hayami et al. do not suggest the desirability of "rapidly removing from a top of

said processing apparatus an upper portion of a semiconductor processing fluid present in said bath while said wafers are in said bath." The proposed combination of Nishizawa et al. and Hayami et al. lacks the required motivation to arrive at the process as recited in claim 12, which includes "immersing said semiconductor wafers in said semiconductor processing cleaning bath," and "reducing a volume of fluid in said semiconductor processing cleaning bath *before removing* said semiconductor wafers, by rapidly removing from a top of said processing apparatus an upper portion of a semiconductor processing fluid present in said bath while said wafers are in said bath." Claim 12 is submitted as patentable over the cited references to Nishizawa et al. and Hayami et al.

Claim 15 recites a method for removing surface contaminants from an air/liquid interface of a semiconductor processing cleaning bath for processing semiconductor wafers. The method includes "immersing said wafers in said semiconductor processing cleaning bath," and "reducing a volume of fluid in said semiconductor processing cleaning bath by rapidly removing an upper portion of a semiconductor processing fluid present in said bath from said processing apparatus, while said wafers are immersed in said bath, by telescopically collapsing sidewalls of a vessel containing said bath to rapidly reduce a liquid holding capacity of said processing apparatus and to remove said surface contaminants from said air/liquid interface." The Examiner recognizes that Nishizawa et al. does not teach telescopically collapsing sidewalls, and relies on Hayami et al. to provide what is missing.

Hayami et al. does not cure the deficiencies of Nishizawa et al. The Examiner asserts that "telescopically collapsing sidewalls" are shown in Figs. 41 and 42 of the reference to Hayami et al. Applicant respectfully disagrees. Figs. 41 and 42 of the Hayami et al. reference do not show "telescopically collapsing sidewalls" as disclosed and recited in the present invention. An exemplary arrangement of telescoping

sidewalls is shown in Figs 5-8 of the present application. As commonly understood, the verb "to telescope" means "to slide within another like the cylindrical sections of a collapsible hand telescope." See Merriam-Webster's Collegiate Dictionary, 10th ed., 2001, p. 1208 (copy attached). Hayami et al. discloses folding sidewalls, and does not teach or suggest telescoping sidewalls. Claim 15 is submitted as patentable over the cited references to Nishizawa et al. and Hayami et al.

Claim 22 recites a method for etching a semiconductor wafer. The method includes "placing an etching fluid into a wet etching vessel," "immersing said semiconductor wafer in said etching fluid," "contacting said semiconductor wafer with said etching fluid for a predetermined time," and "rapidly removing a portion of said etching fluid from an upper surface of said wet etching vessel by hingedly releasing a door located at an upper portion of said wet etching vessel to reduce a liquid holding capacity of said wet etching vessel while said semiconductor wafer remains immersed in a lower portion of said etching fluid."

The reference to Nishizawa et al. discloses a method of treating wafers using a uniform, upward flow of treatment solutions in a vessel having a fixed volume. The Examiner admits that Nishizawa et al. does not disclose "rapidly removing a portion of said etching fluid from the upper surface of said wet etching vessel by hingedly releasing a door located at an upper portion of said wet etching vessel" and relies on Hayami et al. to supply what is missing.

Hayami et al. does not cure the deficiencies of Nishizawa et al. Hayami et al. discloses a method of wafer treatment in which folding walls 20 are folded down to release treating fluid *prior to immersion* of the wafers being treated. Hayami et al. does not teach or suggest "rapidly removing a portion of said etching fluid from the upper surface of said wet etching vessel by hingedly releasing a door located at an upper

portion of said wet etching vessel to reduce a liquid holding capacity of said wet etching vessel *while said semiconductor wafer remains immersed* in a lower portion of said etching fluid," as recited in claim 22.

Further, the proposed combination of Nishizawa et al. and Hayami et al. lacks the requisite motivation, which must come from the prior art, not applicant's disclosure. The fixed volume vessel of Nishizawa et al. is used in a process in which a uniformly rising flow of treatment solution prevents contamination of the air/liquid interface. Further, the wafer can be "put into and taken out of surface treatment without emptying wafer treatment bath 1." Col. 9, lines 4-6 of Nishizawa et al. Thus, the reference to Nishizawa et al. provides no motivation for modifying the wafer treatment device or method to include the folding doors of Hayami et al. Moreover, Hayami et al. discloses releasing the side doors *prior to immersion* of the wafers in the bath, thus achieving the goal of removing floating particles "as soon as possible." See col. 2, lines 46-51. Further, Hayami et al. teaches that at the end of the rinsing process "there are almost no particles P floating on the surface of the cleaning water 100. [...] Thus, when the semiconductor wafers 10 are lifted up, there are almost no particles adhering to the surfaces of each of the semiconductor wafers 10." See col. 6, lines 52-59. Hayami et al. also lacks a suggestion or motivation to combine and modify the references as required to arrive at the present invention. The cited references to Nishizawa et al. and Hayami et al. do not suggest the desirability of "rapidly removing from a top of said processing apparatus an upper portion of a semiconductor processing fluid present in said bath while said wafers are in said bath." Consequently, the proposed combination of Nishizawa et al. and Hayami et al. lacks the motivation required to combine the references and derive the process as recited in claim 22, which includes "immersing said semiconductor wafer in said etching fluid, " and "rapidly removing a portion of said etching fluid from an upper surface of said wet etching

vessel by hingedly releasing a door located at an upper portion of said wet etching vessel to reduce a liquid holding capacity of said wet etching vessel while said semiconductor wafer remains immersed in a lower portion of said etching fluid." The Examiner's states that one of skill in the art would be motivated to modify Nishizawa et al. based on Hayami et al. "because use of the door would have provided removing of contaminants from the top of the wafer etching bath when the door opened." This broad, conclusory statement, however, begs the question. It is not sufficient that the prior art apparatus could be modified to arrive at an apparatus that could perform the recited method steps. There must be some motivation in the prior art, not just from Applicant's disclosure, to suggest that the prior art methods be modified as required to arrive at Applicant's invention. Such motivation is lacking in the prior art.

Further, even if Nishizawa et al. were properly combinable with Hayami et al., the result would involve a method in which doors are used to release bath liquid prior to immersion of wafers, which is not the present invention as recited in claim 22. Claim 22 is submitted as patentable over the cited references to Nishizawa et al. and Hayami et al.

Claim 25 recites a method for etching a semiconductor wafer. The method includes "placing an aqueous hydrofluoric acid solution into a wet etching vessel," "immersing said semiconductor wafer in said aqueous hydrofluoric acid solution," "contacting said semiconductor wafer with said aqueous hydrofluoric acid solution for a predetermined time," and "reducing a fluid-containing volume of said wet etching vessel so as to rapidly displace a portion of said aqueous hydrofluoric acid solution from an upper portion of said wet etching vessel by telescopically collapsing sidewalls of said wet etching vessel, said semiconductor wafer remaining immersed in a remaining portion of said aqueous hydrofluoric acid solution."

The reference to Nishizawa et al. contains no teaching or suggestion of treating wafers in a wet etching vessel by "reducing a fluid-containing volume of said wet etching vessel." Nishizawa et al. also contains no teaching or suggestion of treating the wafers "so as to rapidly displace a portion of said aqueous hydrofluoric acid solution from an upper portion of said wet etching vessel by telescopically collapsing sidewalls of said wet etching vessel, said semiconductor wafer remaining immersed in a remaining portion of said aqueous hydrofluoric acid solution."

Recognizing the deficiencies of Nishizawa et al., the Examiner relies on Hayami et al., but Hayami et al. discloses folding doors, not telescoping doors, which release treatment fluid *prior to* immersing wafers in a treatment bath, not while the wafers remain immersed.

Further, the proposed combination lacks the requisite motivation. As noted above in connection with claim 22, Nishizawa et al. uses a fixed-volume vessel in a method that prevents surface contamination, and Hayami et al. releases treatment solution using folding doors prior to immersion of the wafers. The proposed modification of the reference teachings finds no motivation, other than that provided by applicant, and in any event does not produce the invention of claim 25, which is submitted as patentable over the references to Nishizawa et al. and Hayami et al.

Claims 64 and 67 depend from claim 61, which is submitted as patentable over the reference to Nishizawa et al. Hayami et al. does not cure the deficiencies of Nishizawa et al. Hayami et al. has been cited as providing a hingedly releasing door, as recited in claim 64, or telescopically collapsing sidewalls, as recited in claim 67. The process of Hayami et al., however, is distinct from that of the present invention, in that treatment liquid is released according to the process described in Hayami et al. *prior to immersion* of the wafers. Hayami et al. does not teach or suggest a wafer treatment

method that includes "immersing said semiconductor wafers in said semiconductor processing bath contained in a processing apparatus," and "reducing a volume of said semiconductor processing bath contained within said processing apparatus by rapidly removing an upper portion of said semiconductor processing bath present in said processing apparatus, *while said semiconductor wafers are immersed* in a remaining lower portion of said semiconductor processing bath, to permit flow of said upper portion of said processing bath out of said processing apparatus and reduce a total volume of liquid contained within said processing apparatus and thereby break eddy currents holding said surface contaminants at said air/liquid interface." Further, with respect to claim 67, Hayami et al. does not teach telescoping sidewalls, as discussed above in connection with claims 15 and 25. Claims 64 and 67 are submitted as patentable over the cited references to Nishizawa et al. and Hayami et al.

Applicant notes that the status of claims 12, 26, 27, and 73, submitted as patentable herein, has not been listed on the Office Action Summary. Claims 12, 27, and 73 stand rejected, as noted above. Claim 26 depends from allowed claim 17, and is assumed to be allowed.

Applicant urges entry of this after-final amendment. The amendments are intended to present the claims in better form for allowance. The amendments are necessary to correct antecedent basis and to address the Examiner's concerns related to new matter and support for the claimed invention, which were newly raised in the prior Office action.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Dated: March 25, 2004

Respectfully submitted,

By_____

Thomas J. D'Amico
Registration No.: 28,371
Peter McGee
Registration No.: 35,947
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700
Attorneys for Applicant

Attachment: Definition of "telescoping."

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te·le·pho·nist \tə-'le-fə-nist, 'te-lə-ˌfō-nist\ *n* (1880) *Brit* : a telephone switchboard operator

te·le·pho·ny \tə-'le-fə-nē *also* 'te-lə-ˌfō-\ *n* (1835) : the use or operation of an apparatus for transmission of sounds between widely removed points with or without connecting wires

¹tele·pho·to \ˌte-lə-'fō-(ˌ)tō\ *adj* (ca. 1895) : being a camera lens system designed to give a large image of a distant object; *also* : relating to or being photography in which a telephoto lens is used

²telephoto *n, pl* **-tos** (1904) **1** : a telephoto lens **2** : a photograph taken with a camera having a telephoto lens

Telephoto *trademark* — used for an apparatus for transmitting photographs electrically or for a photograph so transmitted

tele·pho·tog·ra·phy \-fə-'tä-grə-fē\ *n* [ISV] (1892) : the photography of distant objects (as by a camera provided with a telephoto lens)

tele·play \'te-li-ˌplā\ *n* (1952) : a play written for television

tele·port \'te-lə-ˌpōrt, -ˌpȯrt\ *vt* [back-formation fr. *teleportation*] (1947) : to transfer by teleportation

tele·por·ta·tion \ˌte-lə-ˌpōr-'tā-shən, -ˌpȯr-, -pər-\ *n* [*tele-* + *transportation*] (1931) : the act or process of moving an object or person by psychokinesis

tele·print·er \'te-lə-ˌprin-tər\ *n* (1929) : a device capable of producing hard copy from signals received over a communications circuit; *esp* : TELETYPEWRITER

tele·pro·cess·ing \-'prä-ˌse-siŋ, -'prō-, -sə-siŋ\ *n* (1962) : computer processing via remote terminals

Tele·Promp·Ter \'te-lə-ˌpräm(p)-tər\ *trademark* — used for a device for unrolling a magnified script in front of a speaker on television

¹tele·scope \'te-lə-ˌskōp\ *n, often attrib* [NL *telescopium,* fr. Gk *tēleskopos* farseeing, fr. *tēle-* tele- + *skopos* watcher; akin to Gk *skopein* to look — more at SPY] (1648) **1** : a usu. tubular optical instrument for viewing distant objects by means of the refraction of light rays through a lens or the reflection of light rays by a concave mirror — compare REFLECTOR, REFRACTOR **2** : any of various tubular magnifying optical instruments **3** : RADIO TELESCOPE

²telescope *vb* **-scoped; -scop·ing** *vi* (1867) **1** : to become forced together lengthwise with one part entering another as the result of collision **2** : to slide or pass one within another like the cylindrical sections of a collapsible hand telescope **3** : to become compressed or condensed ~ *vt* **1** : to cause to telescope **2** : COMPRESS, CONDENSE ⟨the book arbitrarily ~*s* time and space, and as arbitrarily extends them —Phoebe Adams⟩

tele·scop·ic \ˌte-lə-'skä-pik\ *adj* (1705) **1 a** : of, relating to, or performed with a telescope **b** : suitable for seeing or magnifying distant objects **2** : seen or discoverable only by a telescope ⟨~ stars⟩ **3** : able to discern objects at a distance **4** : having parts that telescope — **tele·scop·i·cal·ly** \-pi-k(ə-)lē\ *adv*

tel·e·sis \'te-lə-səs\ *n, pl* **-e·ses** \-ˌsēz\ [NL, fr. Gk, fulfillment, fr. *telein* to complete, fr. *telos* end — more at TELOS] (1896) : progress that is intelligently planned and directed : the attainment of desired ends by the application of intelligent human effort to the means

tele·text \'te-lə-ˌtekst\ *n* (1974) : a system for broadcasting text over an unused portion of a television signal and displaying it on a decoder-equipped television set — compare VIDEOTEX

tele·thon \'te-lə-ˌthän\ *n* [*tele-* + *-thon*] (1949) : a long television program usu. to solicit funds esp. for a charity

Tele·type \'te-lə-ˌtīp\ *trademark* — used for a teletypewriter

Tele·type·set·ter \ˌte-lə-'tīp-ˌse-tər\ *trademark* — used for a telegraphic apparatus for the automatic operation of a keyboard typesetting machine

tele·type·writ·er \-ˌrī-tər\ *n* (1903) : a printing device resembling a typewriter that is used to send and receive telephonic signals

te·leu·to·spore \tə-'lü-tə-ˌspōr, -ˌspȯr\ *n* [Gk *teleutē* end (akin to Gk *telos* end) + ISV *spore* — more at TELOS] (1874) : TELIOSPORE

tel·evan·ge·list \ˌte-li-'van-jə-list\ *n* (1973) : an evangelist who conducts regularly televised religious programs — **tel·evan·ge·lism** \-ˌli-zəm\ *n*

tele·view \'te-li-ˌvyü\ *vi* (1935) : to observe or watch by means of a television receiver — **tele·view·er** *n*

tele·vise \'te-lə-ˌvīz\ *vb* **-vised; -vis·ing** [back-formation fr. *television*] *vt* (1927) : to broadcast (as a baseball game) by television ~ *vi* : to broadcast by television

tele·vi·sion \'te-lə-ˌvi-zhən *esp Brit* ˌte-lə-'\ *n, often attrib* [F *télévision,* fr. *télé-* tele- + *vision* vision] (1907) **1** : an electronic system of transmitting transient images of fixed or moving objects together with sound over a wire or through space by apparatus that converts light and sound into electrical waves and reconverts them into visible light rays and audible sound **2** : a television receiving set **3 a** : the television broadcasting industry **b** : television as a medium of communication

television tube *n* (1937) : PICTURE TUBE

tele·vi·su·al \ˌte-lə-'vi-zhə-wəl, -zhəl; -'vizh-wəl\ *adj* (1926) *chiefly Brit* : of, relating to, or suitable for broadcast by television

¹tel·ex \'te-ˌleks\ *n* [*teleprinter* + *exchange*] (1932) **1** : a communication service involving teletypewriters connected by wire through automatic exchanges; *also* : a teletypewriter used in telex **2** : a message sent by telex

²telex *vt* (1960) **1** : to send (as a message) by telex **2** : to communicate with by telex

te·lic \'te-lik, 'tē-\ *adj* [Gk *telikos,* fr. *telos* end — more at TELOS] (1889) : tending toward an end — **te·li·cal·ly** \-li-k(ə-)lē\ *adv*

te·lio·spore \'tē-lē-ə-ˌspōr, -ˌspȯr\ *n* [Gk *teleios* complete (fr. *telos* end) + E *spore*] (1905) : a chlamydospore that is the final stage in the life cycle of a rust fungus and that after nuclear fusion gives rise to the basidium

te·li·um \'tē-lē-əm\ *n, pl* **te·lia** \-lē-ə\ [NL, fr. Gk *teleios* complete] (ca. 1905) : a teliospore-producing sorus or pustule on the host plant of a rust fungus — **te·li·al** \'tē-lē-əl\ *adj*

¹tell \'tel\ *vb* **told** \'tōld\; **tell·ing** [ME, fr. OE *tellan;* akin to OHG *zellen* to count, tell, OE *talu* tale] *vt* (bef. 12c) **1** : COUNT, ENUMERATE **2 a** : to relate in detail : NARRATE **b** : to give utterance to : SAY ⟨who dares think one thing, and another ~ —Alexander Pope⟩ **3 a** : to make known : DIVULGE, REVEAL **b** : to express in words ⟨she never *told* her love —Shak.⟩ **4 a** : to report to : INFORM **b** : to assure emphatically ⟨they did not do it, I ~ you⟩ **5** : ORDER, DIRECT ⟨*told* me to wait⟩ **6** : to find out by observing : RECOGNIZE ⟨you can ~ it's a masterpiece⟩ ~ *vi* **1** : to give an account **2** : to act as an informer — often used with *on* ⟨I'll get even with you if you ever ~ on me —*Inside Detective*⟩ **3** : to have a marked effect **4** : to serve as evidence or indication *syn* see REVEAL

²tell *n* [Ar *tall*] (1864) : HILL, MOUND; *specif* : an ancient mound in the Middle East composed of remains of successive settlements

tell–all \'tel-ˌȯl\ *n* (1954) : a written account (as a biography) that contains revealing and often scandalous information — **tell–all** *adj*

tell·er \'te-lər\ *n* (14c) **1** : one that relates or communicates ⟨a ~ of stories⟩ **2** : one that reckons or counts: as **a** : one appointed to count votes **b** : a member of a bank's staff concerned with the direct handling of money received or paid out

tell·ing \'te-liŋ\ *adj* (1851) : carrying great weight and producing a marked effect : EFFECTIVE, EXPRESSIVE ⟨the most ~ evidence⟩ *syn* see VALID — **tell·ing·ly** \-liŋ-lē\ *adv*

tell off *vt* (1804) **1** : to number and set apart; *esp* : to assign to a special duty ⟨*told off* a detail and put them to opening a trench —J. F. Dobie⟩ **2** : REPRIMAND, EXCORIATE ⟨*told* him *off* for his arrogance⟩

tell·tale \'tel-ˌtāl\ *n* (ca. 1548) **1 a** : TALEBEARER, INFORMER **b** : an outward sign : INDICATION **2** : a device for indicating or recording something: as **a** : a wind-direction indicator often in the form of a ribbon **b** : a strip of metal on the front wall of a racquets or squash court above which the ball must be hit — **telltale** *adj*

tellur- *or* **telluro-** *comb form* [L *tellur-, tellus* — more at THILL] : earth ⟨*tellur*ic⟩ **2** [NL *tellurium*] : tellurium ⟨*tellur*ide⟩

tel·lu·ric \tə-'lůr-ik, te-\ *adj* (1836) **1** : of or relating to the earth : TERRESTRIAL **2** : being or relating to a usu. natural electric current flowing near the earth's surface

tel·lu·ride \'tel-yə-ˌrīd\ *n* [ISV] (1849) : a binary compound of tellurium with a more electropositive element or group

tel·lu·ri·um \tə-'lůr-ē-əm, te-\ *n* [NL, fr. L *tellur-, tellus* earth] (1800) : a semimetallic element related to selenium and sulfur that occurs in a silvery white brittle crystalline form of metallic luster, in a dark amorphous form, or combined with metals and that is used esp. in alloys — see ELEMENT table

tel·lu·rom·e·ter \ˌtel-yə-'rä-mə-tər\ *n* (1957) : a device that measures distance by means of microwaves

tel·ly \'te-lē\ *n, pl* **tellys** *also* **tellies** [by shortening & alter.] (1939) *chiefly Brit* : TELEVISION

tel·net \'tel-ˌnet\ *n* [*teletype network*] (1971) : a telecommunications protocol providing specifications for emulating a remote computer terminal so that one can access a distant computer and function on-line using an interface that appears to be part of the user's local system — **telnet** *vi*

telo- — see TEL-

telo·cen·tric \ˌte-lə-'sen-trik, ˌtē-\ *adj* [ISV *tel-* + *centr*omere + *-ic*] (1939) : having the centromere terminally situated so that there is only one chromosomal arm ⟨a ~ chromosome⟩ — **telocentric** *n*

te·lome \'tē-ˌlōm\ *n* [ISV *tel-* + *-ome*] (1935) : a hypothetical plant structure in a theory of the evolution of leaves and sporophylls in vascular plants that consists of one of the vegetative or reproductive terminal branchlets of a dichotomously branched axis

telo·mere \'te-lə-ˌmir, 'tē-\ *n* [ISV] (1940) : the natural end of a eukaryotic chromosome

telo·phase \'te-lə-ˌfāz, 'tē-\ *n* [ISV] (1895) **1** : the final stage of mitosis and of the second division of meiosis in which the spindle disappears and the nuclear envelope reforms around each set of chromosomes **2** : the final stage in the first division of meiosis that may be missing in some organisms and is characterized by the gathering at opposite poles of the cell of half the original number of chromosomes including one from each homologous pair

te·los \'te-ˌlās, 'tē-\ *n* [Gk; prob. akin to Gk *tellein* to accomplish, *tlēnai* to bear — more at TOLERATE] (1904) : an ultimate end

telo·tax·is \ˌte-lə-'tak-səs, ˌtē-\ *n* [NL] (1934) : a taxis in which an organism orients itself in respect to a stimulus (as a light source) as though that were the only stimulus acting on it

tel·son \'tel-sən\ *n* [NL, fr. Gk, end of a plowed field; perh. akin to Gk *telos* end] (1855) : the terminal segment of the body of an arthropod or segmented worm; *esp* : that of a crustacean forming the middle lobe of the tail

Tel·u·gu \'te-lə-ˌgü\ *n, pl* **Telugu** *or* **Telugus** (1789) **1** : a member of the largest group of people in Andhra Pradesh, India **2** : the Dravidian language of the Telugu people

tem·blor \'tem-blər; 'tem-ˌblȯr, -ˌblōr, tem-'\ *n* [Sp, lit., trembling, fr. *temblar* to tremble, fr. ML *tremulare* — more at TREMBLE] (1876) : EARTHQUAKE

tem·er·ar·i·ous \ˌte-mə-'rer-ē-əs, -'rar-\ *adj* [L *temerarius,* fr. *temere* (1532) : marked by temerity : rashly or presumptuously daring — **temer·ar·i·ous·ly** *adv* — **tem·er·ar·i·ous·ness** *n*

te·mer·i·ty \tə-'mer-ə-tē\ *n, pl* **-ties** [ME *temeryte,* fr. L *temeritas,* fr. *temere* blindly, recklessly; akin to OHG *demar* darkness, L *tenebrae,* Skt *tamas*] (15c) **1** : unreasonable or foolhardy contempt of danger or opposition : RASHNESS, RECKLESSNESS **2** : an act or instance of temerity *syn* TEMERITY, AUDACITY, HARDIHOOD, EFFRONTERY, NERVE, CHEEK, GALL, CHUTZPAH mean conspicuous or flagrant boldness. TEMERITY suggests boldness arising from rashness and contempt of danger ⟨had the *temerity* to refuse⟩. AUDACITY implies a disregard of restraints commonly imposed by convention or prudence ⟨an entrepreneur with *audacity* and vision⟩. HARDIHOOD suggests firmness in daring and defiance ⟨admired for her *hardihood*⟩. EFFRONTERY implies shameless, insolent disregard of propriety or courtesy ⟨outraged at his *effrontery*⟩. NERVE, CHEEK, GALL, and CHUTZPAH are informal equivalents for EFFRONTERY ⟨the *nerve* of that guy⟩ ⟨has the *cheek* to call herself a singer⟩ ⟨had the *gall* to demand proof⟩ ⟨the *chutzpah* needed for a career in show business⟩.

¹temp \'temp\ *n* (1886) **1** : TEMPERATURE 2a, c **2** : a temporary worker

²temp *vi* (1973) : to work as a temp

tem·peh \'tem-ˌpā\ *n* [Jav *tempé*] (1950) : an Asian food prepared by fermenting soybeans with a rhizopus

¹tem·per \'tem-pər\ *vt* **tem·pered; tem·per·ing** \-p(ə-)riŋ\ [ME, fr. OF & OF; OE *temprian* & OF *temprer,* fr. L *temperare* to moderate, mix, temper; prob. akin to L *tempor-, tempus* time] (bef. 12c) **1** : to dilute, qualify, or soften by the addition or influence of something else : MODERATE ⟨~ justice with mercy⟩ **2** *archaic* **a** : to exercise control over : GOVERN, RESTRAIN **b** : to cause to be well disposed : MOLLIFY ⟨~*e*